Price 5s. per annum Vol. 4, Part 2, April 1958

COMMONWEALTH PHYTOPATHOLOGICAL NEWS

A QUARTERLY REVIEW OF NEWS AND VIEWS ISSUED BY THE COMMONWEALTH MYCOLOGICAL INSTITUTE, KEW, SURREY

M A I N I T E M S

Moulding of Lenses

A.P.S. Golden Jubilee

Society Secretaries and Meetings

From Near and Far

Personal News

Overseas News

MOULDING OF LENSES

by H.A. Dade
Commonwealth Mycological Institute

Most workers in the humid tropics are familiar with the troublesome and destructive growth of moulds on the lenses of microscopes and other optical instruments. Vision may be totally obscured by the dense growth of mycelium, and eventually lens and prism surfaces become etched, often so badly as to preclude reconditioning.

Service Conditions

Usually, moulding is so easily prevented that it really presents no problem at all. The exception is the case of military instruments during the exigencies of active service, in preparation for which it may be necessary for manufacturers to employ special control methods. Sometimes this is possible by careful sealing of instrument bodies after thorough drying of the internal components, but this cannot be done when focussing adjustments set up a bellows effect, pumping air in and out of such instruments as binoculars and telescopes. In such cases the usual treatment is to incorporate slightly volatile fungicides in capsules built into the bodies of the instruments, cresatin being the most useful substance for this purpose. Sodium merthiolate can also be used, with certain precautions: the gas which it gives off in the presence of moisture attacks metals.

Civilian Instruments

Special protection is hardly necessary for civilian instruments like microscopes, theodolites, and cameras. All that is necessary is to place the lenses, when they are not in use, or the entire instrument if that is more convenient, in a desiccator. On the lab. bench this may conveniently be a glass cabinet with hinged doors, but many other simple kinds of container can be used, according to the nature of the instruments and the conditions in which they are used, as, for example, when one

is travelling. The best desiccating agent is of course silica gel, with an incorporated cobalt indicator (blue when gel is active, pink when it needs reactivation by heating in an oven or on top of a stove). Silica gel is so safe and clean to handle that all methods are simplified when it is used; in most cases it can be put loose into containers such as wide-mouthed, stoppered bottles. In Ghana, the writer used to keep camera films in a small stoppered bottle with loose gel, the bottle then being stored in the refrigerator. Nowadays, the universally useful polythene bags can be used to store a great variety of materials, from theodolites to clothing, the silica gel being then enclosed in gauze pockets, and the bags closed by folding their mouths two or three times and securing them with paper clips or bull-dog clips, or by simply binding them with soft copper wire in PVC insulation. Metal boxes with rubber or polythene gaskets under the lids are obvious alternatives. Calcium chloride, which becomes wet when it absorbs moisture, has restricted uses. In emergency, old newspapers can be pressed into service: they are very hygroscopic, and can be prepared by sunning them during dry spells, packing them away while still warm and crackling in the desiccating box.

Mechanics of Etching

Control by these simple methods is so effective that any discussion of the fungi which are involved might seem rather academic. There are, however, interesting aspects of mould growth on lenses. Many common moulds have been reported as involved because they have been isolated from mouldy lenses, but attempts to grow them on glass seem to have had little or no success. It is probable that lens moulds actually derive their nutrition, not from the glass, but from organic dust which finds its way to the lenses and their mounts. Dust collects particularly on balsam surrounding lenses, and the mycelium seen on lenses often grows in from the margins. Microscope slides which have been kept in damp places also show such growth associated with dust clinging to the balsam; but balsam itself does not seem to support growth. The etching effect may result from the action of metabolic products of the moulds; it may, however, be partly or wholly due to purely physical phenomena. In the damp tropics, especially where the diurnal fluctuations in temperature are extreme, glass surfaces held in contact with damp air may be rapidly and deeply corroded as the result of alternating condensation and evaporation, minute quantities of glass being dissolved in the condensation water and deposited when the water evaporates. The writer has seen this happen inside empty, stoppered glass bottles stowed in a store with an iron roof, very hot during the daytime, and quite cool at night: the inside surfaces broke down quickly into white powder, producing a ground glass appearance. To prevent this, later supplies were stored full of water, and in these no deterioration occurred. Even in Britain the same kind of corrosion occurs in, for example, dry cell microscopical preparations where the object was not thoroughly dried before sealing: the cover glass becomes obscured, even when no moulds develop.

The Fungi

The writer suggests that at least some of the common moulds isolated from mouldy lenses may not have been active at all, but may have grown from quiescent spores among the dust particles; also that the really active organisms may have been overlooked because they have not developed in the first isolation plates. Except in very extreme cases, growth on lenses is slow, in conditions not very favourable to most moulds. Condensation inside the instruments occurs only in small quantity, and when the temperature rises the moisture dries up. The fungi which grow in these conditions must therefore be able to withstand, in their mycelial state (for they rarely sporulate), very severe desiccation and, if they ramify in a thin film of dissolved glass, very high osmotic pressure as the solution concentrates. These considerations led the writer to use media of high osmotic pressure, which produced interesting results. Briefly, these have revealed the existence on lenses of highly specialized strains which fail to grow, or produce only very slow, restricted, and sterile growth on the usual media, but which grow quickly and sporulate profusely on malt extract agar to which has been added 40 per cent. of sucrose. Such strains can be easily overlooked if isolation is attempted with

normal media.

Physiological Specialization

In two cases, somewhat abnormal, different strains belonging to the Aspergillus glaucus group were found; specific identification was not possible because no ascocarps could be induced to form. These isolations showed only very poor growth on malt extract agar with 20 per cent. added sucrose, the medium commonly used for the glaucus group. In another case a similarly abnormal strain of A. fumigatus was found, and more recently a strain of A. versicolor lacking metulae and also exceedingly xerophilic. An unidentified actinomycete has also been seen. It is perhaps not very surprising to find members of the A. glaucus group (which consists of species all well-known as xerophils) with unusually extreme adaptations of this nature; but A. fumigatus and A. versicolor are not usually thought of in this connection. Possibly mutation in this direction is an inherent genetical tendency in Aspergillus; not conspicuous because such mutants must fail in all but exceptional instances. Similar adaptations are shown by a few fungi not associated with lens moulding. Eremascus albus also demands 40 per cent. of added sucrose in culture media, and Sporendonema sebi (syn. Nemispora stellata), which occurs on beans stored in salt, actually grows over the salt crystals in a film of concentrated brine; it also occurs on sugary preserves. It would be interesting to know what physiological mechanism protects these fungi from plasmolysis. The use of media of very high osmotic pressure is suggested in other cases where this condition is associated naturally with other fungal problems.

AMERICAN PHYTOPATHOLOGICAL SOCIETY

GOLDEN JUBILEE

An event of quite considerable moment in the world of plant pathology is due to take place next August in the United States at Bloomington, Indiana. The Golden Jubilee of the American Phytopathological Society is to be celebrated with due ceremony (and no doubt a little pomp) by a symposium divided into ten sections covering the whole of the field of plant pathology, each section to be presided over by an acknowledged authority in each subject to be discussed, which are The Structure of Viruses (W. M. Stanley), The Multiplication of Plant Viruses (K. M. Smith), The Chemistry of Fungicides (Hubert Martin), Fungicides (L. Gordon Utter), The Physiology of Parasitism (Robert Scheffer), Genetic Approach to Elucidation of Mechanisms Governing Pathogenicity and Disease Resistance (W. C. Snyder), and Soil Microbiology and Root Disease Fungi (K. F. Baker). An average of just over five papers is being contributed to each section by well known specialists in the subjects, including a number of visitors from Britain.

In addition six major addresses are to be delivered under the general heading of Historical and Developmental Aspects of Plant Pathology.

The Proceedings of the meeting will be published in a volume of about 1,000 pages under the title "Plant Pathology - Problems and Progress 1908-1958" priced $8·50. Publication is expected during the winter of 1958.

Further particulars from Dr. George A. Zentmyer, Citrus Experiment Station, University of California, Riverside, Cal.

L A T E N E W S

Dr. W. E. Sackston has been appointed head of the Plant Pathology Section of the Canada Agriculture Research Laboratory, Winnipeg.

Change of Address

From 1st March the address of the Plant Pathology Laboratory, Lyamungu, P.O. Moshi, Tanganyika, will be P.O. Box 302, Arusha, Tanganyika.

SECRETARIES OF BIOLOGICAL SOCIETIES OF INTEREST TO PLANT PATHOLOGISTS

Compiled from information received from the Biological Council

ASSOCIATION OF APPLIED BIOLOGISTS: General Secretary: Dr. L. Broadbent, Rothamsted Experimental Station, Harpenden, Herts.

BOTANICAL SOCIETY OF THE BRITISH ISLES: General Secretary: Dr. J.G. Dony, 41 Somerset Ave., Luton, Beds.

BOTANICAL SOCIETY OF EDINBURGH: Secretary: P.S. Green, Esq., Royal Botanic Garden, Edinburgh, 4.

BRITISH ECOLOGICAL SOCIETY: Secretaries: E.D. Le Cren, Esq., Ferry House, Far Sawrey, Ambleside, Westmorland. Dr. C.H. Gimingham, Dept. of Botany, the University, Aberdeen.

BRITISH MYCOLOGICAL SOCIETY: Secretary: Dr. J.G. Manners, Dept. of Botany, The University, Southampton.

GENETICAL SOCIETY: Secretary: Dr. J.A. Roper, Dept. of Genetics, The University, Glasgow.

LINNEAN SOCIETY: Secretary: (Botanical), Dr. C.R. Metcalfe, The Linnean Society, Burlington House, London, W. 1.

ROYAL ENTOMOLOGICAL SOCIETY OF LONDON: Secretary: E.B. Britton, Esq., Royal Entomological Society, 41 Queen's Gate, London, S.W. 7.

ROYAL HORTICULTURAL SOCIETY: Secretary: A. Simmonds, Esq., Royal Horticultural Society, Vincent Square, London, S.W. 1.

ROYAL MICROSCOPICAL SOCIETY. Secretaries: Dr. F.J. Aumonier, F.J. Cuckow, Esq., Royal Microscopical Society, Tavistock House South, Tavistock Square, London, W.C. 1.

SOCIETY FOR GENERAL MICROBIOLOGY: General Secretary: Prof. K.E. Cooper, Bacteriology Department, The University, Bristol.

SYSTEMATICS ASSOCIATION: Secretaries: Dr. A.J. Cain, University Museum, Oxford. R.D. Meikle, Esq., Royal Botanic Gardens, Kew, Surrey.

MEETINGS

May
8 Botanical Society of Edinburgh
8 Linnean Society
10 Institute of Biology (Yorkshire Branch) (Hull)
21 Royal Microscopical Society. Substance differentiation by electrons and X-rays
22-27 British Mycological Society (Bettws-y-coed). Spring Foray
24 Linnean Society Anniversary Meeting

June
12 Botanical Society of Edinburgh. A.G.M.
20 Association of Applied Biologists (Cambridge). Visit to N.A.A.S.

July
3 Institute of Biology (London Branch). Conversazione
15 Linnean Society. Darwin-Wallace Centenary

August
4-10 International Congress of Microbiology (Stockholm, Sweden)

September
3-10 British Mycological Society (Reading). Autumn Foray
11-12 Association of Applied Biologists (Aberdeen). Health of potato crops

September (contd.)
15-19 Society for Experimental Biology (Reading). Utilization of nitrogen by plants
25-26 Institute of Biology. Pollution of air and water
October
9 Linnean Society
10 British Mycological Society (London)
23 Linnean Society
November
6 Linnean Society
7 Association of Applied Biologists. Soil-borne diseases
8 Botanical Society of the British Isles and Botanical Society of Edinburgh (Glasgow). Exhibition Meeting
20 Linnean Society
29 Botanical Society Exhibition
December
4 Linnean Society. Exhibition
5 Association of Applied Biologists (London)
6 British Mycological Society (London). A.G.M.

POTATO SPRAYING FROM AIRCRAFT

J.H. Stapley sends an interesting addendum to his article on low volume spraying in the January, 1958, issue of C.P. NEWS.

During the last year most successful trials have been carried out in the United Kingdom applying a proprietary cuprous oxide spray, containing 50 per cent. copper, to potatoes by aircraft.

Three applications, each of 3 lb. of the 50 per cent. product per acre in 3 gallons water gave more efficient and prolonged protection against potato blight (Phytophthora infestans) than two applications each of 5 lb. per acre applied by conventional means.

The third and last aerial application was made at a time when the growth of the crop was too far advanced for ground spraying to be considered.

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FROM NEAR AND FAR

The Colonial Products Laboratory has moved from the Imperial Institute, South Kensington, London, to a new site in Gray's Inn Road and has been renamed the Tropical Products Institute.

I.C.I. has extended its Research Fellowship Scheme from 92 to 103 ranging from £700 to £1,000 p.a. in chemistry, physics, engineering and related subjects. Total contributions to education and research by I.C.I. now totals £300,000 p.a. Who will help the plant pathologist?

Conferences

The First International Meeting on seed pathology will be held in Cambridge from 12 to 17 May, 1958, under the auspices of the International Seed Testing Association. The main object of the meeting is to discuss means of standardizing testing techniques for seed-borne pathogens. Other subjects include the effects of seed dressings on tests and the interpretation of test results in terms of field performance. The meeting is open to all scientists interested in this subject.

The Fifteenth International Horticultural Congress was held in Nice from 11 to 18 April. Particulars about report of proceedings from the secretariat, 84, Rue de Grenelle, Paris, 7.

A special session on the taxonomy of the Streptomycetes is being arranged at the Seventh International Congress for Microbiology to be held from 4-9 August, 1958, in Stockholm.

The Sixth International Congress in Tropical Medicine and Malaria will be held in Lisbon from 5-13 September, 1958. It is expected that the C.M.I. will be represented in the medical mycology section.

At the Ninth International Botanical Congress, Montreal, 19-29 August, 1958, pre- and post-congress excursions to the number of 24 are proposed. Several are specifically concerned with plant pathology and mycology.

Notes on Publications

UNESCO published last April a SURVEY OF SCIENTIFIC INSTITUTIONS IN EGYPT [received January 1958] containing staff lists of the Cairo, Ein Shams, and Alexandria Universities, Ministry of Agriculture and other ministeries, Science Council, and other scientific bodies, with a personal index. The Department of Plant Protection has an establishment of 130 experts, 44 of whom are in the Phytopathological Division. We are informed that there are 4 M.Sc.'s and 4 Ph.D.'s.

Dr. Franz Verdoorn, so well known as the managing editor of the Chronica Botanica Co., is returning to the Netherlands to take up an appointment as director of the new Biohistorical Institute of the University of Utrecht. The publication programme of the Chronica Botanica Co. (with a few exceptions such as BIOLOGIA) has been taken over by the Ronald Press Co. of New York, which is developing a 'Chronica Botanica' division under the direction of John A. Behnke with Dr. Verdoorn as consulting editor.

ANNALES DE L'INSTITUT PHYTOPATHOLOQUE BENAKI [Kifissia-Athenes, Greece] has commenced a new series with No. 1, 1957.

H.M. Stationery Office, London, has published another volume of SCIENTIFIC RESEARCH IN BRITISH UNIVERSITIES [1956-7], which briefly outlines the various projects and also most usefully lists not only the institution, but heads of departments and other staff engaged in supervision of the various researches as well.

No. 8 in the series REVIEWS OF DATA ON RESEARCH AND DEVELOPMENT issued by the U.S. National Science Foundation gives details of expenditure on re-

search in agricultural experiment stations during 1953-4 in the United States. There has been an increase from $7m. in 1920 to $74m., granted to 53 stations.

Where would you go to seek all the available information on the pathology of Plasmodiophora brassicae? To the REVIEW OF APPLIED MYCOLOGY of course: we know that. But that only takes you to 1921. What about the literature of the last century? If you are teaching, this is an important subject in your syllabus. Now in the press in the advanced proof stage is a monograph by John Colhoun, of Queen's University, Belfast, which deals in 108 pp. (12 pp. refs.) with almost every aspect of this disease in a highly condensed form. It will be published about the middle of 1958 by the C.M.I. at 20s. post free. If there is found to be a demand for this type of publication consideration will be given to issuing monographs of other classical diseases.

An addition to the series of handbooks on crop diseases in Ireland, written by Prof. R. McKay, is CEREAL DISEASES IN IRELAND, published by the Three Candles Press (1957) pp. x + 161 + 54 plates, Dublin, 21s. Extremely well illustrated, with some colour plates, it is a very useful guide for advisory officers, as well as being a must for the plant pathology library.

A VISIT TO SOUTH AFRICA

by Grace M. Waterhouse

(concluded)

The Sugar Research Station (Director, Dr. McMartin; Plant Pathologist, Dr. Thompson) at Mt. Edgcombe, near Durban, is like most laboratories maintained by Industry beautifully equipped. Plant pathology is mostly concerned with routine advisory matters and there is little time (and insufficient personnel) to deal with some items of pure research that appear to the staff to be essential. For example, detailed knowledge of the life history of sugarcane smut (Ustilago scitaminea) would in all probability solve the difficulty of getting a high percentage of successful artificial inoculations for testing resistant varieties (the reasons for very poor success are not known); a serological method for detecting ratoon stunting virus is needed; the possibility of strain differentiation in Xanthomonas vasculorum needs investigation. Dr. Thompson has, nevertheless, made some progress with these problems. He showed me some excellent colour transparencies of Natal sugar-cane diseases.

At Pietermaritzburg I found Dr. Truter (Professor of Plant Pathology and Microbiology) housed in a magnificient new building (Agricultural College of the University). Two or three of her students have worked out neat little mycological problems, one on Pestalozzia sp. on Podocarpus, and another on the life history of Elsinoe viticola. Dr. Truter herself is embarking on a long-term series of experiments to investigate outbreaks of Phytophthora infestans in relation to local weather. Blight is often very serious on potatoes and, particularly, tomatoes in parts of Natal, and spraying is not always sufficiently inhibitory. The races present and their identity will be worked out.

It was a pleasure to be able to call in on Dr. V.A. Wager at the Department of Plant Pathology, Durban, who has had many contacts with C.M.I. in the past, particularly in relation to work on Phycomycetes, many of the S. African specimens in Herb. I.M.I. being of his collections. His work is mostly advisory and he has put it to good use in compiling a book on 'Diseases of Ornamentals in South Africa', a companion book to his 'Diseases of Vegetables' recently published.

I also visited (1) the University Botany Department at Cape Town where mycology (and microbiology) are in charge of Dr. Olivier, who showed me two interesting new fungi she hopes shortly to describe; (2) that at Pietermaritzburg; (3) the Divisions of Botany and Plant Pathology, Pretoria, which hope to have new buildings soon at the new Botany Reserve outside the city; and (4) Miss E. L. Stephens, who had just received a premier S. African award for her services to natural history. Though retired she is hard at work not only on fungi (chiefly agarics) but also on other groups of plants.

P E R S O N A L N E W S

C.M.I. NEWS

The Director paid a second official visit of two weeks to Kenya in February and had discussions with local research officers on plant disease problems, more especially coffee stem diseases and the incidence of Armillaria mellea in forest plantations and in crops such as tea. He spent some days at the Tea Research Institute, Kericho, and on commercial estates.

The Assistant Director gave his third Presidential Address to the Queckett Microscopical club in February. His subject was 'On spherical aberration in the microscope'.

The Director addressed the post-graduate seminar on 'Science in the New Commonwealth Nations' organized by Dr. W.F. Jepson at the University of London Institute of Commonwealth Studies: he spoke on the impact of plant diseases on tropical cultivation, particularly the social and political aspects.

Dr. Agnes H.S. Brown left the Institute at the end of March to be married. She is going to Malaya.

Visitors

Among overseas visitors were A. Ghaffar and Abdul·Kafi, Pakistan, and C.K. Reheem, Pakistan representative on the Executive Council of C.A.B.; K. Hiratsuka, Kagno Goto, and Prof. Yoshii, Japan; Alai Singh Yadav, India; J.S. Hemingway, Tanganyika; Z. Bosecki, Poland; S.R. Chant, Nigeria; T.H. Williams, N. Borneo; L. Piening, Ghana.

'Pool' Notes

Dr. Wheeler arrived in Zanzibar at the end of February.

Appointments, Promotions, Retirements, etc.

The Overseas Service Division of the Colonial Office announce the following: L.H. Brown, deputy director of agriculture, Kenya; H. Doggett, botanist, E.A.A.F.R.O., Kenya; C.E. Johnson, assistant director of agriculture, N. Rhodesia; R.W.J. Keay, principal forest research officer, Nigeria; W.E.M. Logan, chief conservator of forests, Uganda; D. MacDonald, plant pathologist, W.A.C.R.I.; T.A. Phillips, director of agriculture, E. Nigeria; A.L. Reid, plant protection officer, Jamaica; T. Rice-Hughes, assistant director of agriculture (field), Kenya; J.H. Simons, plant protection officer, W. Nigeria.

Mr. W.G. Alexander of the A.R.C. has been appointed U.K. representative on the C.A.B. Executive Council in succession to Mr. W.C. Thame, and Mr. C.D. Ryan of the Economics Division, Department of Agriculture, Dublin, liaison officer for the Republic of Ireland in place of Mr. S.M. Breathnach.

Dr. E.E. Chamberlain has been appointed director of the Plant Diseases Division, D.S.I.R., New Zealand, in succession to Dr. G.H. Cunningham, who retired recently after 40 years' service.

Parasitic Nematodes

Plant Pathologists in Eastern Australia have greatly enjoyed and profited by the recent extended visit of Dr. E.J. Anderson of the Hawaiian Pineapple Research Station, Honolulu. His surveys have greatly extended knowledge in New South Wales of the incidence of sting nematodes.

OVERSEAS NEWS

NOTES FROM CANADA

Two reports of recent research in Canada are reviewed below.

Agropyron Streak Mosaic in Ontario: Since his coming to Ottawa last summer Dr. John T. Slykhuis has turned his attention to the local occurrence of virus diseases in cereals. He has now found a streak mosaic on Agropyron repens at a number of locations near Ottawa and Toronto. The same disease was also identified on wheat and Triticum × Agropyron hybrids in the experimental plots at the Central Experimental Farm.

The chlorotic streaks caused by agropyron streak mosaic resemble the streak symptoms caused by mild strains of wheat streak mosaic, but the host ranges of the two viruses differ. Agropyron streak mosaic virus infects species of Agropyron not susceptible to wheat streak mosaic, and does not cause symptoms on oats or barley, both of which develop symptoms from infection with wheat streak mosaic virus. This agropyron streak mosaic virus appears to be similar to one reported by McKinney from Virginia and by Slykhuis from South Dakota.

Agropyron streak mosaic virus, like wheat streak mosaic virus, is transmitted by an eriophid mite as well as by manual sap inoculations. Eriophyid mites found on diseased wheat have transmitted the virus to wheat and A. repens.

Seed Treatment for the Control of Potato Blackleg: Because blackleg continues to be a disease of considerable importance on potatoes wherever they are grown in Canada, the Science Service Laboratory at Charlottetown has undertaken further studies on the disease.

In 1957 several seed treatment chemicals were tested by J. E. Campbell and Dr. D. B. Robinson for blackleg control of Sebago, a very susceptible potato variety. All seed pieces were cut and inoculated before treatment with a suspension of Erwinia atroseptica. Dry and water-dipped checks developed 40 per cent. blackleg; captan and spergon were ineffective in controlling the disease but semesan bel and acid mercuric chloride treatments gave satisfactory control. A combination treatment of semesan bel and agristrep (streptomycin sulphate) resulted in the least amount of blackleg development, 2·7 per cent. of the plants being affected.

In other trials, in which seed treatments were tested for the control of Verticillium wilt, blackleg occurred quite consistently throughout the plots through chance contamination. Under these conditions, treatment of the seed with phygon, dithane, captan, and spergon were quite ineffective in reducing blackleg; infections ranged from 16·8 to 37·3 per cent. of the plants. However, wherever the seed pieces were treated with semesan bel, blackleg infections never exceeded 1 per cent.

A number of methods of handling the seed before planting were examined. Small tubers planted whole produced no blackleg regardless of whether they were contaminated with the organism or first contaminated and then surface disinfected, whereas freshly cut seed, inoculated and planted the same day, developed 25 to 30 per cent. blackleg.

I. L. Conners

NEWS FROM NEW SOUTH WALES

Mechanism of Resistance in Barley Varieties to Powdery Mildew: This subject has been under investigation at the University of Sydney by Professor N. H. White, K. Scott and Dr. A. Millerd. Resistance to Erysiphe graminis var. hordei Marchal has previously been shown to be closely associated with mesophyll cell collapse (White, N. H. and Baker, E. P. (1954), PHYTOPATHOLOGY, 44: 657) and a strong correlation demonstrated between the degree of resistance and the rapidity of this cell collapse. In susceptible varieties there is no cell collapse.

A histological examination showed that very few cells were involved in the collapse and that these were not necessarily in contact with the fungal haustoria. It therefore seemed unlikely that the pathogen failed to develop because it lacked a living host.

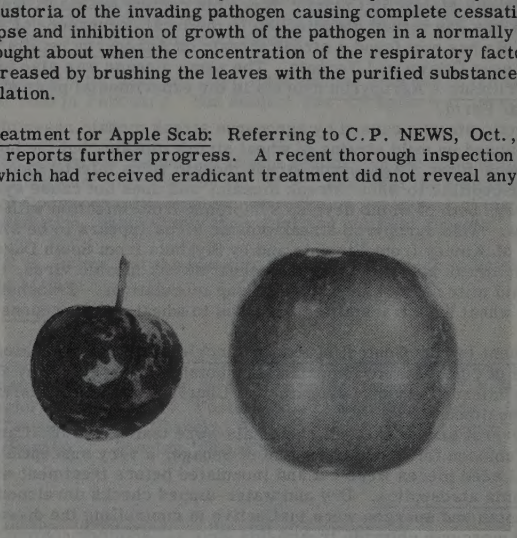
Extracts from infected barley leaves have been shown to contain a factor capable of causing both increased respiration and cell collapse of non-infected barley leaves.

This substance, termed the Respiratory Factor, has been purified by chromatography on thick paper and by ion-exchange resins.

During the purification a fungistatic phenolic compound was isolated. It was shown that this compound was present in both non-infected and infected semi-resistant and susceptible strains. It seems probable that cell collapse is associated with the release of this compound, along with other cytoplasmic and vacuolar constituents, into the intercellular spaces. The compound finally accumulates round the haustoria of the invading pathogen causing complete cessation of growth.

Cell collapse and inhibition of growth of the pathogen in a normally susceptible host was brought about when the concentration of the respiratory factor was artificially increased by brushing the leaves with the purified substance shortly before inoculation.

Eradicant treatment for Apple Scab: Referring to C.P. NEWS, Oct., 1957, p.42, K.E. Hutton reports further progress. A recent thorough inspection of an orchard at Maroota which had received eradicant treatment did not reveal any sign of scab.



Granny Smith apples collected 7 February, 1956. Left — Average sample from orchard at Glenorie sprayed with a poorly timed schedule of Bordeaux mixture and lime sulphur sprays during 1955-6 season. Right — Average sample from experimental orchard at Maroota 5 miles from Glenorie orchard sprayed with autumn eradicant mercury spray in late March, 1955. Not sprayed during 1955-6 season, except for one lime sulphur spray on 22 December.

At the completion of the 1954-5 season this plot of approximately 2 acres, isolated by about 5 miles from the nearest apple orchard, was severely infected with apple scab. In autumn 1955 it was thoroughly sprayed with 0·1 per cent. phenyl mercuric acetate. By the middle of the following season trace infection occurred in one corner of the block and a single lime sulphur spray was applied in December. In autumn 1956 the orchard was thoroughly sprayed with 0·1 per cent. phenyl mercuric chloride and no fungicide has been applied since. During the 1956-7 season the only black spot detected was trace infection on four leaves late in the season. These were picked off. No autumn eradicant was applied in 1957 and to date no new lesion has been detected. The plot is carrying a heavy crop of high quality fruit. There is hope that the experiment at Maroota will prove to be the first instance of the eradication of black spot from a N.S.W. orchard.

Conference on Citrus Viruses: Dr. Lilian R. Fraser attended the Citrus Virus Conference held at Riverside, California, in November last. The Conference was attended by almost 200 delegates from the citrus-growing States of the United States and from Israel, French Morocco, Jamaica, Pakistan, Philippine Is., Egypt, South Africa, Peru, and Australia. It seems that a very considerable amount of work remains to be done before conflicting views on some viruses, notably tristeza, xyloporosis, and stubborn, can be explained. Dr. Fraser's thesis that tristeza is identical with yellows and that diagnoses based on indexing on West Indian lime leads to stem pitting being confused with tristeza aroused much interest.

C.J. Magee

NEWS FROM AFRICA

SOUTHERN RHODESIA

More about Tobacco Anthracnose

Seed-borne transmission

The causal agent of tobacco anthracnose in Northern and Southern Rhodesia has been established as Colletotrichum tabacum Böning. The fungus was first described from tobacco in Germany by Böning (1, 2) as long ago as 1929.

According to Riley (3) the disease was first observed in tobacco seedbeds in Northern Rhodesia in 1949. It was not discovered in Southern Rhodesia until December, 1953, when it suddenly appeared in Virginia type tobacco seedlings on a farm at Nyabira.

Böning reported the disease to be seed-borne, although only a small percentage of seed from obviously infected capsules appeared to be infected. He obtained good control by treating the seed for 30 minutes in silver nitrate at 0·25 per cent. concentration (1 in 400), but qualified this statement by indicating that complete control by seed disinfection is probably not possible as in some cases the mycelium appears to be within the tissues of the seed. On the other hand Riley reported that tobacco anthracnose did not seem to be seed-borne in Northern Rhodesia since repeated attempts to isolate C. tabacum from seed of plants raised from infected seedlings gave negative results. This accorded with the absence of infection of flowers or seed capsules in his field observations. However, Riley did not entirely exclude the possibility of seed-borne infection since he maintains that his observations did not preclude the possibility of introduction into the territory on seed in the first instance.

Severe anthracnose infection on under surface of a tobacco seedling leaf. Note characteristic elongate lesions on midrib and veins.

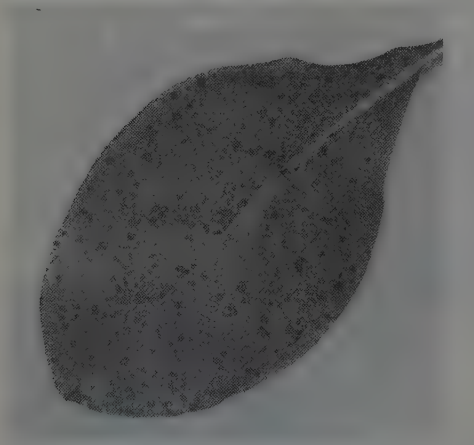
Our early experience with tobacco anthracnose in Southern Rhodesia closely paralleled that reported by Riley in the adjoining territory. The reason for its sudden appearance on one farm has not up till now been satisfactorily explained. No other cases were recorded during the 1953-4 season. Thereafter, the gradual spread of the disease during the 1954-5 and 1955-6 seasons could have been due to methods of dissemination other than by infected seed. During this period also anthracnose appeared to be essentially a disease of seedlings, favoured perhaps by the local environment and high population density of seedbeds. Occasional outbreaks were observed in the field where infected seedlings had been planted, but no instances were either seen or reported where anthracnose became systemic on the plant at maturity.

For these reasons and the fact that all tobacco seed offered for sale in Southern

Rhodesia is normally treated with 1:1000 silver nitrate solution for 15 minutes, the likelihood of locally produced seed carrying the disease was regarded as very remote.

Unusually early and persistent rainfall during the 1956-7 season was accompanied by the widespread development of anthracnose throughout tobacco growing districts of Southern Rhodesia. The severity of this outbreak led some growers to suggest that tobacco seed was, indeed, responsible for carrying the disease to new localities, but as no specific cases were brought to our notice it was not possible to follow up the matter more closely at the time.

The first clear cut example implicating tobacco seed was obtained in October, 1957, when the disease appeared for the first time in Nyasaland in seedbeds sown with seed imported from Southern Rhodesia. The disease was confined to the seedbeds of growers using imported seed derived from a single producer in Southern Rhodesia.



Severe anthracnose infection on upper surface of young tobacco leaf.

Even more striking circumstantial evidence was obtained a few weeks later from Tanganyika where the disease appeared, also for the first time on record, in the seedbeds of no less than 16 growers all of whom had sown Southern Rhodesian seed. Enquiries revealed that the seed used came from the same producer as in the case of the Nyasaland outbreak.

Samples of the seed used by several Nyasaland growers whose tobacco became infected were returned to this laboratory for examination. The samples included one unopened tin of the original seed. A check sample of the same seed, retained by the seed testing laboratory of the firm which processed and packaged it, was also obtained. Preliminary chemical tests showed that all these samples had been treated with silver nitrate and, as far as could be determined, the amounts of residual silver were of the order to be expected on seed properly treated in the first place.

Attempts to determine the presence of C. tabacum from individual seed using several cultural techniques have so far been unsuccessful with these samples although more than 3,000 seeds have been used in this work. On the other hand, the disease appeared in young seedlings grown in trays containing a sterilized soil-sand mixture some three weeks after they were sown with the suspected seed. Seed from each of the samples returned from Nyasaland and also from the locally retained check sample was tested in this manner and all gave rise to infection. Similar trays sown with tobacco seed from other sources, including samples retained from the 1955-6 crop, were used as controls and all remained entirely free from infection.

It was observed that only one or two foci of infection developed in each of the trays sown with suspected seed. This, together with the difficulty in detection in individual seeds, suggests the degree of infection present in the suspect samples

was of a very low order.

This confirmation of the seed-borne nature of tobacco anthracnose raises several important issues. Of immediate practical importance is the need to ensure that only disease-free seed is produced both for local use and for export. Work is also in progress to determine the exact manner in which C. tabacum is carried by the seed.

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G.R. Bates

TANGANYIKA

Tobacco anthracnose: Colletotrichum tabacum Böning has now appeared in Tanganyika. After being confined to the Southern Province of Northern Rhodesia for several years, this disease spread to Southern Rhodesia in late 1953 and to Nyasaland and Tanganyika in 1957. The two last outbreaks have now been traced to infected seed from Southern Rhodesia. In Tanganyika, the disease is at present confined to Urambo and Chunya where the Hicks variety is grown, using seed imported from Southern Rhodesia. The main tobacco-growing area at Iringa is unaffected having used locally-grown seed (var. Virginia Gold). Apart from the evidence provided by the distribution of the disease in Tanganyika, Dr. G.R. Bates in Southern Rhodesia has confirmed that tobacco seed there has been found to carry C. tabacum [see Southern Rhodesia above]. Although early-sown seed-beds were severely damaged in Tanganyika, zineb sprays frequently applied have given excellent control and satisfactorily protected later-sown beds.

E.A. Riley

UGANDA

Leaf Blight of Maize: With the increased use of early maturing varieties, such as K. 8, and the rust-resistant types, leaf blight has increased in importance, because these varieties are more susceptible to the disease than the older varieties of the Muratha type.

In an attempt to assess the importance of the disease a spraying experiment was carried out on maize planted at approximately monthly intervals, in which the yield and disease incidence of plots sprayed twice weekly with a commercial preparation of zineb were compared with similar unsprayed plots. Although the disease was only partially controlled large increases in yield resulted from the spraying. This was due to an increase in the yield per plant, heavier cobs and seed, and for K. 8 and AFRO 53200 an increase in the number of usable cobs. The appearance of the cobs was also greatly improved.

Selection of leaf blight-resistant plants was started within K. 8 and rust-resistant types. Natural infection was moderately heavy because of the proximity of earlier planted maize but the young plants were also inoculated with ground, dried, diseased tissue dropped into the leaf funnels. There appeared to be only a low level of resistance in the existing bulks, but genes for a higher level of resistance are available in such types as Muratha.

Preliminary results have indicated that infection can only take place if a film of water is present on the leaf and that this must persist for at least one and a half hours. However, the longer the water film persisted the greater the number of plants which became infected. There were indications in the glasshouse that infection was influenced by the water and nutrient status of the host.

Sugar Cane Ratoon Stunting: The first ratoon crop was harvested in the heat-treatment experiment at Bukalasa, at the age of twelve months. Cane from heat-treated plots had more nodes, and greater internodal length and girth. In spite of this,

however, there was no difference in the weights of single canes, because the main effect of R.S.D. on yield appears to be in the reduction of tillers. Material harvested from this experiment was used to plant demonstration plots on two sugar estates.

In the early part of 1957 it was found that much of the heat-treated cane at Kawanda was showing internal symptoms similar to those of R.S.D. Examination of heat-treated cane at Kawanda, on the sugar estates, and in the heat-treatment experiment at Bukalasa showed that although much of the Kawanda cane had red colouration of the vasculars at the nodes this was always accompanied by other signs of vascular breakdown, similar to those termed "internal stalk necrosis" by other workers. The cane, therefore, could be regarded as free from the disease.

B.J.T. Baldwin

SOUTH AFRICAN NEWS

Fruit Diseases: Scab of apples and pears, anthracnose of grapevines, and bacterial canker of stone fruits (Pseudomonas syringae), which often appear in serious epidemics, were unimportant during the year in the Cape Province, except locally. This may in part have been the result of a drier spring, but it is also due to more effective application of spraying programmes.

Evidence is accumulating about the prevalence of virus diseases in deciduous fruit. Stony-pit occurs in pears, especially Beurre Bosc and Packham's Triumph. "Green crinkle" has been observed in apples, and rubbery wood found on four farms. Mosaic in peaches and plums is becoming more prevalent. In grape vines two abnormalities have appeared: rasp leaf, similar to enation leaf (Hewitt), particularly on Waltham Cross, characterised by delayed foliation and enations on the underside of the leaf, and saw-edge leaf also coupled with delayed foliation, but the leaves have no enations and are deeply toothed.

In citrus, black spot (Phoma citricarpa) is still on the increase. Predisposing conditions may facilitate spotting, and the continual spread of the disease may not be so much a matter of the spread of the fungus as of orchards becoming increasingly susceptible. There is now evidence that the viruses of exocortis and xyloporosis occur in citrus in South Africa as well as those of tristeza, psorosis, and vein enation.

Potatoes: The breeding of disease-resistant potato varieties continues. One new variety, with immunity from wart disease and considerable resistance to viruses and blight, has shown much promise in Natal and the Eastern Free State. Many new lines are now being screened, and it is expected that most of the common diseases will be controlled by resistance.

Cereals: A bacterial leaf spot of maize similar to holcus spot (Pseudomonas syringae) this year caused some concern. It occurred extensively in the Western Transvaal but did not do great damage to the crop. In the same areas a stem rot caused by an unidentified bacterium was more prevalent than in any previous year.

White rust or leaf blight (Helminthosporium turcicum) of maize occurred only very late in the season, causing negligible damage. This disease can build up very rapidly as the season advances and it is recommended that very susceptible types such as PPXK64 be planted as early as possible. Seed of more resistant hybrids is being produced at an ever increasing rate.

Suitable inoculation techniques for testing inbred lines against Sphacelotheca reiliana in the breeding of resistant lines have been devised.

Among wheat diseases a root rot was discovered in experimental plots at Pretoria University, and is now reported to occur widely in the Vaalharz irrigation scheme. It is characterised by white mycelium covering crown, roots, and stem base, and has a strong smell of mushrooms. As it needs a high temperature for development it has been noticed only in late-maturing wheat.

A previously unrecorded disease of rice, sheath spot, caused by Rhizoctonia oryzae occurred in the northern Transvaal.

Other Crops: The fungicidal dust, karathane, has been found to be effective against

powdery mildew (Erysiphe cichoracearum) of tobacco. Work is also in progress to breed resistant varieties. Experimental work has shown that mildew is prevalent only where the mean temperature of the summer months is below 25°C. Good results have been obtained by using tannic acid as a disinfectant against mosaic.

A noteworthy outbreak of disease during the year was that of gummosis of sugar cane, caused by Xanthomonas vasculorum. It had not previously been recorded in South Africa, but there is no evidence that it has recently been introduced. More probably it has been present unnoticed for many years, and flared up when conditions were exceptionally favourable, viz. a wet season and a susceptible variety like NCo. 310.

NEWS FROM INDIA

At the Indian Agricultural Research Institute, the virus nature of the following five diseases of fruits has been established:-

Line Pattern of Plum: The disease causing yellow vein banding in the leaves with occasional development of oak leaf pattern has been successfully transmitted by grafting to seedling peach (Prunus persica) and almond (P. amygdalus), and a wild prune (P. puddum), besides plum.

Plum Mosaic: A disease of plum showing characteristic mosaic symptoms has been found widespread in the Simla area. Its virus nature has been determined and it has been transmitted by grafting to seedling peach and P. puddum, besides plum varieties Greengage and Becky Smith. Colour tests have given positive indication. This virus does not appear to have been reported elsewhere in India.

Apple Mosaic: A disease of Red Gold variety of apple manifested by yellowing and flecking mottle has been transmitted by bud-grafting. Also a disease characterized by ring spot mottle has been found to affect apple plantations (variety Red Delicious) in the Simla Hills. The disease is under investigation.

Mosaic of Himalayan Raspberry: A severe disease characterized by a yellowish or a light green mosaic, ring spot and oak leaf pattern has been observed in Rubus ellipticus which grows wild in Simla Hills. About fifty per cent. of the bushes are infected. Line pattern, complete chlorosis, and dwarfing of leaves have also been observed. The disease with typical mosaic symptoms has been successfully transmitted by inarch grafting, by bottle-graft technique, and by dodder (Cuscuta reflexa Roxb.). This species of dodder is common in India.

Mango Malformation: The disease, which is widespread in most of the mango areas in India, is characterized by the malformation of young shoots and of inflorescences. It has been successfully transmitted to young healthy plants by grafting, showing thereby the virus nature of the disease.

Late Blight of Potato: This disease, which till recently was considered to be of minor importance in the plains, appeared in an epiphytotic form over vast areas in Northern India this season. This was due to the favourable environmental conditions prevalent this year for the development of the disease, as also to the perpetuation of disease through seed tubers kept in cold storage.

R.S. Vasudeva

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'Agrosan' 5W kills fungi in two ways

'Agrosan' 5W is an organo-mercurial seed dressing. It is specially formulated for use as a slurry and can also be applied dry. 'Agrosan' 5W disinfects cereal, cotton and flax seed in two ways: (1) by adhering to the seed and killing all seed-borne fungus spores with which it comes in contact, (2) by means of a volatile constituent which penetrates the glumes or chaff of such seeds as oats or barley, killing all *hidden* fungus spores. 'Agrosan' 5W prevents seed decay and partially controls seedling blights, thus improving the plant stand.

'Agrosan' 5W protects many crops

Here is a list of diseases against which 'Agrosan' 5W is effective:

COTTON
Anthracnose (*Colletotrichum gossypii*)
Seedling blight (*Glomerella gossypii*)
Blackarm disease (*Xanthomonas malvacearum*)

WHEAT
Bunt or stinking smut (*Tilletia caries*)

BARLEY
Covered smut (*Ustilago hordei*)
Black loose smut (*Ustilago nigra*)
Leaf stripe (*Helminthosporium gramineum*)
Net blotch (*Helminthosporium teres*)

OATS
Covered smut (*Ustilago killeri*)
Loose smut (*Ustilago avenae*)
Leaf stripe (*Helminthosporium avenae*)

RYE
Bunt (*Tilletia caries*)
Stripe smut (*Urocystis occulta*)

SORGHUM
Loose smut (*Sphacelotheca cruenta*)
Covered smut (*Sphacelotheca sorghi*)

RICE
Footrot (*Gibberella fujikuroi*)
Leaf spot (*Helminthosporium oryzae*)

FLAX
Seedling blight (*Colletotrichum linicola*)
Damping-off (*Fusarium spp.*)

SUGAR-CANE
'Pineapple' disease (*Ceratostomella paradoxa*)

How to apply 'Agrosan' 5W

Dry treatment—Apply as a dry dust, in seed dressing machines which give accurate measurement of the powder and uniform coverage of the seed.

Slurry treatment—'Agrosan' 5W can also be used easily and efficiently in any good slurry seed treater. In this method, a small quantity of water is used to distribute the dressing on the grain. This water evaporates quickly and the dressed seed is not noticeably dampened. Slurry treatment has distinct advantages in that the dust hazard to operators is reduced and even with very small dosages, uniform and accurate distribution on the seed is obtained.

Sett treatment for sugar-cane

Use 'Agrosan' 5W as a dip to control 'pineapple' disease in sugar-cane setts. For details of treatment, apply to your nearest Plant Protection agent.

Storage of dressed seed

Treated seed may be stored up to 12 months before it is sown, provided initial germination is high, the moisture content of the seed does not exceed 16% at the time of dressing, and it is stored under dry, cool conditions.

Plant Protection Ltd

A subsidiary of Imperial Chemical Industries Ltd

Printed lithographically in Great Britain at the University Press, Oxford, by Charles Batey, Printer to the University

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